Emergency medicine

The directions of organisational and structural solutions of Chemical Defence Troops involved in non-military tasks

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Summary:
This paper presents the pursuit for further changes in the perception of the role of armed forces in the contemporary world, new challenges for chemical defence troops, new types of threats that will force to seek for new solutions to problems. The role of units and sub-units of chemical defence was highlighted as one of the elements administering specialized forces that operate in National Emergency System and can participate in removing the effects of natural disasters. The troops participate with dedicated forces and resources in conducting constant reconnaissance as a part of National Environmental Monitoring.
The paper also states that contemporary threats impose high requirements on chemical defence system of Armed Forces of the Republic of Poland. Therefore its constant restructuring is essential in order to make it capable to respond for crisis arising. First steps have been already taken and the next should be taken as quick as possible. These should include:
- updating the legal status of issues concerning the use of troops in special circumstances (disasters, catastrophes, etc.) and the principles of accounting for such actions;
- implementation of the remaining standards concerning the issues of chemical defence troops allowing for complete compatibility in operations with other NATO armies;
- creating an effective chemical defence management system based on the network allowing for transmission and processing of information;
- planning the principles of using chemical defence troops in crisis situations with administrative authorities and local government s;
- equipping soldiers participating in rescue operations with suitable protective clothing and insulating masks or absorbers ensuring the safety during work in the atmosphere contaminated with toxic industrial materials.

Key words: toxic industrial materials, WMD, spread zone, contamination forecast, Crisis Management Centre

1. A threat of toxic industrial materials occurrence to the territory of the country

1.1. Basic concepts and definitions

Toxic industrial materials is a term without unambiguous, generally accepted definition. Numerous definitions, sometimes widely varying, can be encountered in literature. This is the cause of misunderstandings in counting certain substances to toxic industrial materials. I will cite two definitions to make an example:

'**Toxic industrial materials** are chemical substances of various kinds, usually materials used in the industry that in certain conditions may cause injuries (poisonings) to humans and animals and result in degradation of the environment'.

'**Toxic industrial materials** are chemical compounds with toxic properties, used in large amounts in the industry or transported and having capability of easy transition to the atmosphere in case of the damage (failure) of the devices and causing injuries to the population'.

The term 'hazardous substance' means a substance or mixture which due to one or more chemical, physical or toxic properties is considered to be a threat. Because of possible threat they pose to people and environment, such substances are the subject of interest of many institutions. Seventy five hazardous substances are produced, processed and used in Poland. Among hazardous substances the group of extremely hazardous substances is to be distinguished.

Chemical contamination is a term used in environmental protection to define contamination emitted by the industry, public utility and living sector, and transport i.e. gas contamination of the atmosphere, contamination of water and soil by sewage and solid waste contamination of water environment and lithosphere.

Industrial contamination includes thus a very large group of chemical compounds of various state of matter, different capability of transition into the atmosphere and various toxicity, causing possible changes in the environment.

1.2. Toxic industrial pollution

Poland is exceptionally exposed to this type of contamination. It results from the scope of national chemical industry and consolidating position of Poland as a country of primary processing of raw materials. National industry processes fossil raw materials with energy-intensive methods using outdated technologies and equipment until raw products are produced. The products are exported abroad, whereas industrial waste, hard to recycle is left in the country. Their amount is often higher than the amount of manufactured goods and usually they are toxic and harmful to humans.

In the territory of the Republic of Poland there are over 500 plants using in production process or storing toxic industrial materials. They are characterized by high sensitivity to accidents, damages or failures due to the considerable number of pipelines, high pressure in the systems and the presence of flammable materials. The accidents in the plants or their destruction can lead to the formation of vast zones of chemical contamination.

Plants are located in the territory of the country in an nonuniform manner. The majority of them is concentrated on the Vistula along its entire course (Kwidzyń, Bydgoszcz, Toruń, Włocławek, Płock, Puławy, Tarnów). Another grouping of chemical plants using toxic industrial materials concentrates along the upper reaches of the Oder River from Brzeg Dolny and in the area of Upper Silesia. The largest are located in Brzeg Dolny, Kędzierzyn, Chorzów, Jaworzno, Police, Kostrzyń andGorzów Wielkopolski.

In addition to the plants using toxic industrial materials located in the territory of the country, chemical contamination may result from the accidents in chemical plants situated near our borders. These include i.a. chemical plants in Schwedt, Wittenberg and Ostrava.

Another potential source of risk is a transport of toxic substances associated with supply of raw materials to chemical plants, their transit and export.

1.3. Accidents in production plants

Depending on the type of accident, toxic chemical substances escape to the atmosphere either in a single act (a burst) or during a certain period of time. The amount of toxic substances, which can be found in the atmosphere in a given time depends on i.a. constructional design and tank capacity, type of chemical compound, scale and type of the damage, physical parameters and storage conditions of chemicals as well as the scale, type and duration of the actions undertaken to localise the failure.

Weather conditions in the area of failure have also significant impact on the size of leak of toxic substances from damaged systems. Owing to the very complex nature of quantity relations conditioning the size of leak of various substances from specific systems (tanks), in practice when assessing the scale and consequences of failures this type, the amount of substance released in a given time depending on the type of damage is not specified. Data assuming one-time leak of all substances or data from the identification of failure are interpreted as a rule. In particular instances, very different quantities of substances (from several kilograms to the hundreds of tons) can seep into the environment during the leak The level of threat caused by each accident is, however, determined not only by the amount of released substances but also by their toxicity.

In case of massive industrial disasters accompanied by the leak of toxic substances to the environment, the threat to the population is caused by various amount of toxic compounds. For example, during the accident of Union Carbide chemical plants in India in 1984 the leak of toxic compound (methyl isocyanide) lasted for 30 minutes and at least 5 tons of chemicals escaped to the atmosphere. After the disaster in Soveso chemical plant in Italy

3 kilograms of highly toxic dioxin were released to the environment.

Contamination zone of toxic industrial materials covers the site of the accident (the leak) and the zone, where contaminated air spreads with concentration causing given injuries (fatal, moderate, slight, threshold). The surface of the leak formed due to the spillage of toxic industrial materials covers usually relatively small area and it is often limited by ground embankment, which are built in many cases around tanks (systems) containing toxic substances. In the worst cases it covers several hectares.

Toxic substances in a solid form of high fragmentation (triturate), while escaping o the environment especially under certain pressure, may be carried by the wind and as a result they may contaminate larger area. Contaminated area my take on the shape of circle, ellipse or irregular figure. The size of the areas may amount to several hectares, whereas in very unfavourable weather conditions they may reach the size of few km^2.

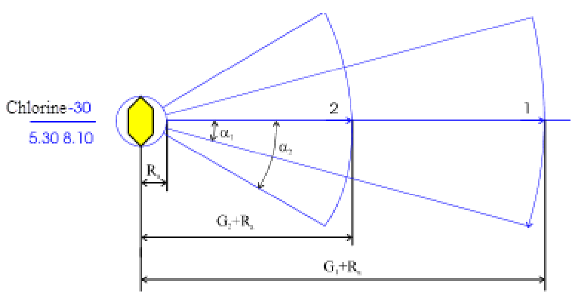


Figure 1: A diagram of expected contamination zones after the accident of a plant using toxic industrial materials.

G_1,G_2 – the depth of spreading of primary and secondary cloud;
R_a – the radius of the damaged area (accident area);
$α_1$, $α_2$ – a dilation angle of the side boundaries of the contamination zones.

Source: *Metodyka oceny sytuacji chemicznej po skażeniach toksycznymi środkami przemysłowymi* , Warsaw 1993: 19.

Toxic substances in the liquid state spread gravitationally in the area of accident. They may flow into ditches, valleys, sewers, rivers, etc. If toxic industrial materials gets into the river, water becomes contaminated on a large distances reaching dozens and hundreds of kilometres and sometimes even the entire length of the river.

The destruction area (accident area) is characterized by the strongest toxic effects of toxic industrial materials. Its radius depends on the storage conditions and the scale of destruction (accident). For most materials it does not exceed 1 km. The radius of the destruction area increases 1.5–2 times, when fires occur, what is substantiated with the increased likelihood of the leak of more toxic industrial materials under such conditions as well as the splattering due to the bursts.

The zone of spreading cloud of contaminated air (primary and secondary) results from the evaporation of the toxic substances from the accident site. It has a shape of a sector with centre located in the site of accident (Figure 1).

The depth and dilation angle of the side boundaries of contamination zones depends on numerous factors i.e. type and amount of released toxic industrial substances, topographical conditions, season and weather conditions in the ground layers of the atmosphere (wind speed and direction, layer, precipitation). Large amount of the factors affects great variation of the cloud range of contaminated air in various conditions. For example, the depth of the contamination zone may reach several dozen of kilometres for chlorine — a compound used in large amounts in chemical industry

2. Organisational solutions

'Regulamin działań taktycznych wojsk lądowych' provides a new task, which was imposed on the chemical defence troops, namely an obligation in non-military actions in peacetime. However, the assignment of the tasks for a given subject always involves the adjustment of the tasks regardless of the situation in which it can find oneself and in which it will have to fulfil the entrusted tasks. Often it leads to complete change both in the organizational and structural field. Therefore, how do these tasks affect the current state of chemical defence troops?

The first of them is the participation in measurement and studying the changes occurring in chemical and radiological situation in a specified area (district, region, country). Taking into consideration the data analysis two directions of changes shall be considered:

- improvement of technical instruments of measurement;
- the development of a computer system.

While considering the development of technical measurement instruments, the equipment for identifying chemical, radioactive and biological contamination should be taken into account.

The first should meet basic requirements i.e.:

- they should enable the determination of the amount and type of toxic substances;
- they should be characterized by high efficiency of operation, while detecting toxic substances in various forms above permissible concentration;

- they should be easy to use (universal use), automated;
- they should have low operating costs.

The requirements for the detectors of toxic industrial materials are not so excessive as in the case of blood agents due to the fact that the toxicity of industrial materials is lower than the toxicity of blood agents. The analysis of the value of threshold lethal doses of toxic industrial materials revealed that the required detectability of such substances shall amount to 10–50 mg/m^3.

For a long time devices basing on chemical and biochemical reactions involving colour changes (e.g. PChR-54M) have been used to detect chemical contamination. However, the major disadvantage of such devices is too long detection time. Therefore, detectors basing on physical and physicochemical methods are becoming more common. They can operate continuously in automated systems. In comparison to chemical detectors, they operate faster, determine concentrations more accurately and eliminate the subjective factor that is an operator.

Equipping contamination reconnaissance subunits with remote detectors would be even better solution. By making measurements from a large distance from the contamination site, such device would ensure:
- the possibility of monitoring large areas or a building without risking humans life and health;
- fast detectability of contaminations;
- longer reaction time for endangered populations and troops.

It seems appropriate to use helicopters as a carrier of such devices.

In order to use detectors of radioactive contaminants in non-military actions, they must be able to detect ionising radiation of a very low power. On the other hand, the dosimeters must be able to measure very low doses of radiation and their individual owners must have the possibility to immediately obtain a reading and record the absorbed dose. Detectors of radioactive contaminants should be able to detect various types of radiation i.e. α, β, γ as well as they should be noted for low measuring error.

Devices for detection of biological contamination constitute another problem. They should be able to detect contamination caused by biological warfare agents as well as identify secondary biological contamination resulting from e.g. a flood. Nowadays, there is high probability that only USA possesses the possibility to detect biological contamination.

It would be particularly important to develop computer system, because the database system concerning contamination can be used during war and in peacetime. The system should be based on the computer network with appropriate means of communication. Information gathered in such network should be transferred from the lowest level i.e. contamination detection squads to the centre of the analysis of contamination at the central level. Simultaneously, the processed information should be transferred to the lowest command level as far as necessary. Thus, operating conditions of automated system of commanding chemical defence would be created. The second part of this undertaking is to develop the data concerning situation of contamination. Fundamental changes occur in this regards. The old methodology is being replaced by methodology of forecasting contamination situations in accordance with ATP-45A and ATP-45B. What had also change was the graphical representation of contamination situations and their mathematical justification.

Another problem to be solved is how to perform contamination forecast. Manual method of calculation and drawing contamination zones should be replaced with fast computer programs or templates as e.g. in the Bundeswehr. Undoubtedly, it will shorten the duration of analysis of contaminated cloud behaviour and simultaneously it will enable a quicker response in case of actual threat.

Another enterprise undertaken by the chemical defence troops during peacetime is 'maintaining in a permanent readiness and sending them to rescue actions in case of the occurrence of extraordinary threats, chemical and radiation emergency teams'. The teams are maintained in readiness to act in a manner depicted in the second chapter of this paper. However, taking into account the directions of development of chemical defence troops in non-military operations, it is to be considered about the numerical strength of the teams, technical potential of the devices used, feasibility of the response (in terms of the readiness to operate) as well as the way of fast relocation to the site of the accident. This involves transport and rescuers that have to be in constant readiness.

The third non-military enterprise during the peacetime is 'cooperation with emergency units of national system for combating threats to eliminate the consequences of chemical and radiation accidents'. This issue was further described in the second chapter of the paper. It can be concluded that nowadays it is a basic enterprise of chemical defence troops in realisation of non-military operations. However, the system for combating threats in the country is still being formed and no detailed plans of cooperation of the army with non-military system of the country have been developed yet. While planning the tasks the needs and data of local authorities and central government bodies. There should be a close link between units that are to cooperate and civilian emergency units. Thus, it will be possible to determine the scope of help provided by a military unit and to familiarize with local risks so that the soldiers could be prepared well to combat them. The planning must include: probable areas of threat, location of protective buildings, organisation of cooperation, communication, security of emergency actions, forecasting the development of the situation, the use of local base, evacuation of the population, feasibility of emergency actions. The organisation and improvement of chemical defence troops in realisation of this enterprise is an essential task in the development of such troops.

The last enterprise undertaken by chemical defence troops during peacetime is to perform tasks arising from treaties and international agreements concerning the participation in missions organized by the UN and NATO. This task will require professional behaviour from soldiers of chemical defence troops. The development of the troops in these operations will be conditioned by international standards. The issue has been already discussed in the second chapter of the paper. At this point, I would like to draw the attention to the integration of chemical defence troops in operating with other armies of NATO. Annex 5 contains the list of NATO documents concerning chemical defence, which are currently being implemented and require an introduction to the Polish Army.

The documents listed in the annex affect the directions of transformation of chemical defence troops participating in non-military operations. After analysing their content, it can be concluded that from the documents already implemented documents No. 1, 3, 4, 7, 8, 9 and documents requiring implementation No. 1, 2, 4, 5, 7, 8, 11, 12 and 13 have direct impact on this enterprise.

In order to allow sub-units of chemical defence troops to take part in emergency actions outside the country, some changes in organisation of their training course are required. The following questions should be posed: what kind of training should be chosen? Where should it take place and what would be its subject? As for the place of training, mostly it would take place in an exercise ground near barracks. However, specialist training will be conducted by specialist centres e.g. chemical rescue stations (as it occurs with current rescuers of CHRZA (Chemical and Radiant Emergency Teams) trained in Płock). Expert officers or civilian experts e.g. chemical rescuers, fire fighters etc. can conduct a training.

The scope of training should include both theoretical and practical skills. In addition, training must include rescue actions performed in cooperation with other services especially in urbanized areas. It should be pointed out that the training of a rescuer-chemist lasts 80 hours (practical and theoretical courses). The question therefore arises if we are able to prepare recruit service soldiers to such operations? In my opinion, the solution to this issue would be to increase the professionalization of the army. Having so few training hours in this issue, recruit service soldiers cannot be expected to be completely professional. They can only perform auxiliary tasks outside the zone of direct rescue actions.

2.1. Stuctural solutions

According to the six-year development plan of the Armed Forces of the Republic of Poland, the next phase of their reorganization is currently being implemented. It creates the opportunity to improve the organization of chemical defence troops and adapt them to perform new tasks in the organisation of the Armed Forces being created.

Former reduction of the number of sub-units of chemical defence troops caused the increase in the number of tasks for 'surviving' units. It is very hard to perform all tasks using units we have at the moment. Estimating the number of sub-units that should be included in our army is very difficult as well. The experiences of other countries revealed that chemical defence troops should constitute at least 1% of total number of soldiers (mostly during the war, when operation troops are more necessary). However, in this case the criterion will not be training military sub-units to perform non-military tasks, but strengthening of the Armed Forces with specialist sub-units.

A new structure of the Chemical Defence System is recently being prepared. The goal of this action is to:
- improve the efficiency of the Chemical Defence System in new organisational structures;
- adapt of the functioning system to the current threat of using WMD;
- prepare the system for actions in NATO.

Centre of Defence against Mass Destruction Weapons will constitute the core of the new system. Its tasks will include:
- organisation of international and interministerial cooperation in the defence against WMD;
- management of the defence against WMD in the entire Armed Forces of the Republic of Poland;
- determination of the principles of the armed forces in the conditions of WMD usage and in case of contamination with toxic industrial materials;
- coordination of the use of forces and resources assigned to the elimination of the effects of exceptional risks;

- organisation of the Contamination Detection and Warning System;
- coordination of the forces and resources assigned to support peacekeeping missions in NBC defence;
- coordination of the implementation of Chemical Weapons Convention.

After the analysis of the forthcoming tasks of the Centre of Defence against Mass Destruction Weapons it may be concluded that it will have a decisive impact on the management of chemical defence troops in non-military operations. It may be also hoped that direct cooperation of the Centre of Defence against Mass Destruction Weapons with Crisis Management Centre will organise the tasks and participation of chemical defence troops in elimination of the effects of exceptional risks. The schema of the cooperation of the Centre of Defence against Mass Destruction Weapons with major public institutions and NATO Headquarters is shown in Figure 2.

The entire Chemical Defence System shall consist of three subsystems:

- protection against contamination;
- detection of contamination and warning the army;
- the removal of the effects of mass destruction weapons.

The goal of the subsystem of protection against contamination is to reduce the effects of striking power of nuclear, chemical and biological weapons and toxic and radioactive industrial materials on the troops operating in the contamination site.

The subsystem of detection of contamination and warning the army aims at providing commanding officers and staffs of all command levels with information about using mass destruction weapons, nuclear and chemical accidents, radioactive, chemical and biological contamination. It also performs the tasks related to warning and alerting troops about such threats. The subsystem will be used during the war, although its elements are used in the peacetime as a part of the State Environmental Monitoring.

The subsystem of the removal of the effects of mass destruction weapons presented in Annex 6 seems to be the most crucial for the operation in the peacetime. It is designed to conduct special operations after the strike using WMD and extraordinary threats for the benefit of operational units and territorial defence. However, as it was previously noticed, whether there is a necessity, it can also perform tasks for the benefit of civilians both in the country and abroad. Figure 2 presents forces functioning on particular levels in the subsystem of the removal of the effects of contamination, which seems to be the

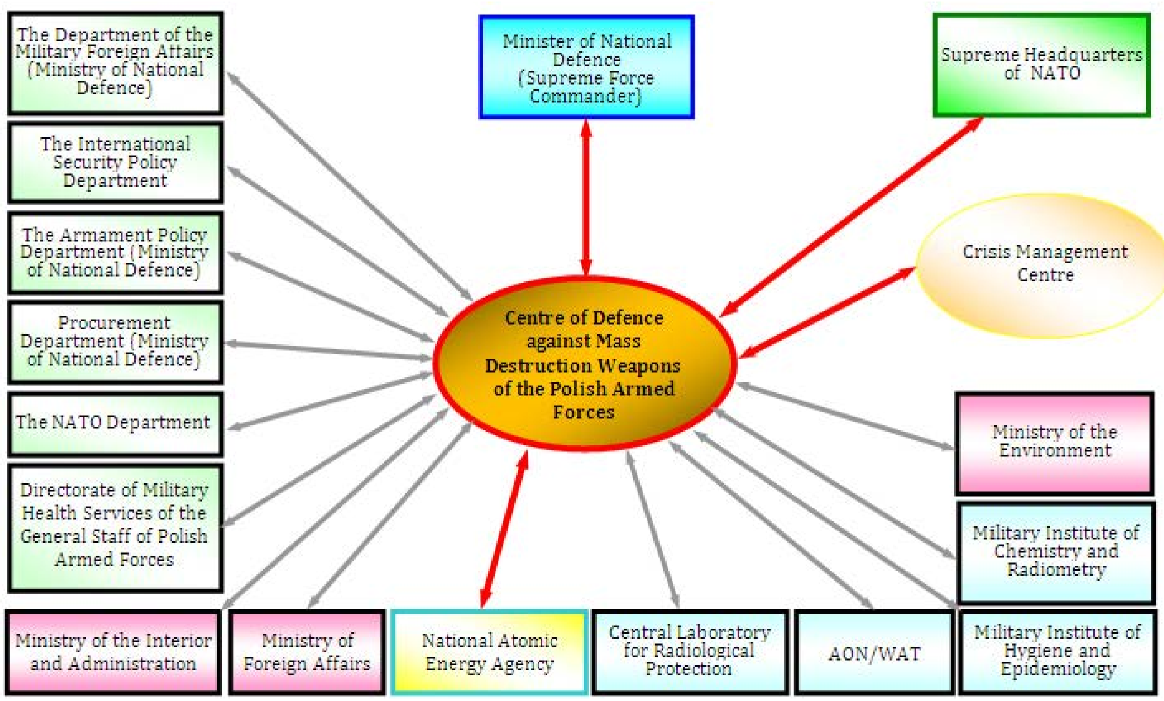
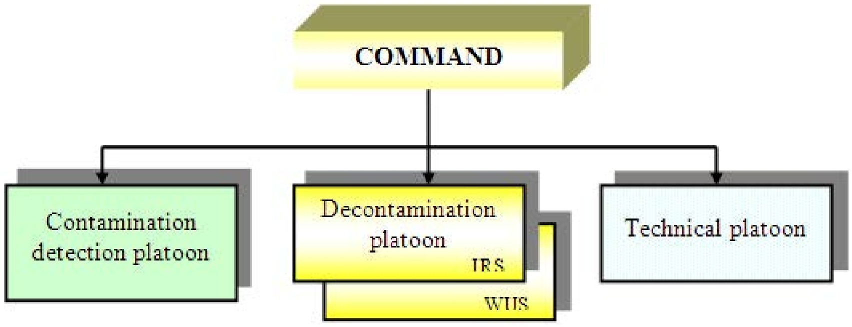


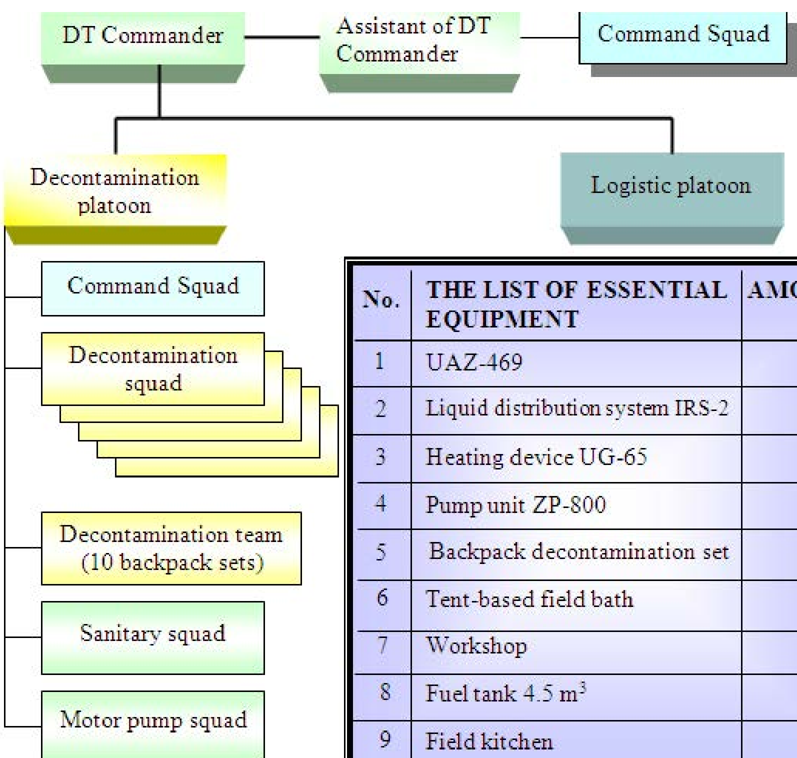
Figure 2: An outline of cooperation of Centre of Defence against Mass Destruction Weapons of the Polish Armed Forces and national institutions (draft).

Source: *Directorate of Chemical Defence Troop*.



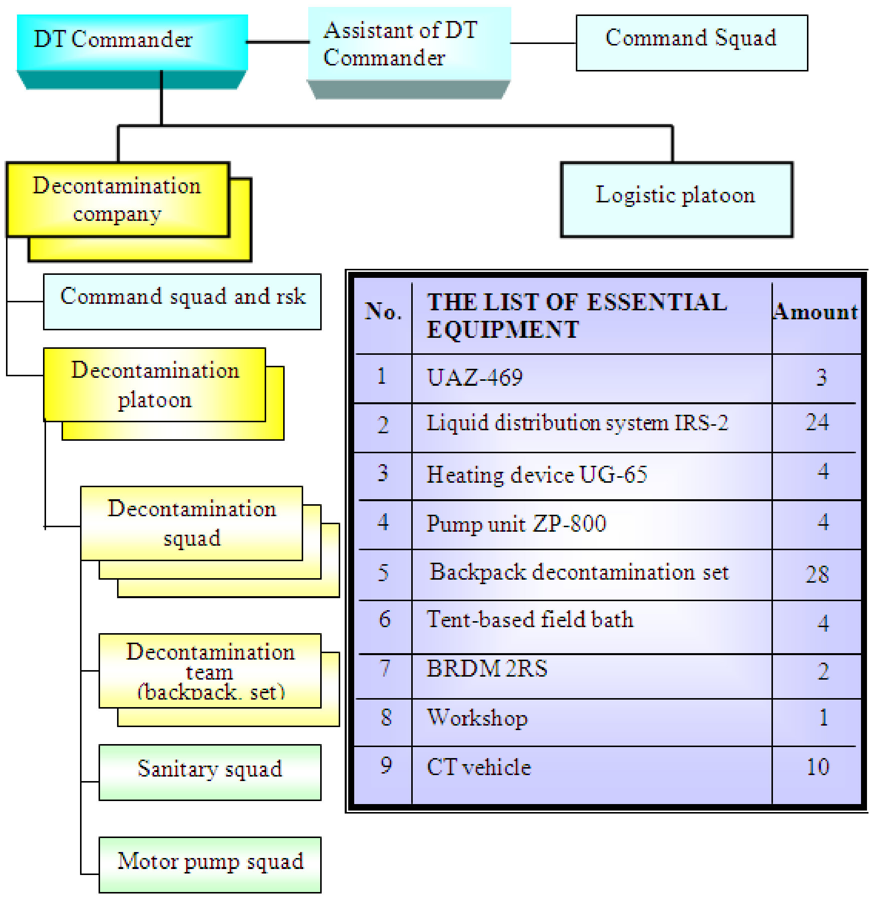
No.	THE LIST OF ESSENTIAL	AMOUNT
1	BRDM 2	3
2	High-peformance decontamination	2
3	Liquid distribution systems	9
4	Heating device	2
5	Pump unit	1
6	Tent-based field bath	1
7	CT-Vehicle	5
8	Trailers	3
9	Repair workshop	2

Figure 3: Operational group of chemical defence troops of central ChRZA.
Source: *The structure of 4th popchem.*



No.	THE LIST OF ESSENTIAL EQUIPMENT	AMOUNT
1	UAZ-469	2
2	Liquid distribution system IRS-2	10
3	Heating device UG-65	1
4	Pump unit ZP-800	1
5	Backpack decontamination set	10
6	Tent-based field bath	1
7	Workshop	1
8	Fuel tank 4.5 m^3	1
9	Field kitchen	1

Figure 4: DT structure separated from bopchem (a variant).
Source: M. Jarośiński, M. Świtek, I. Jurkiewicz: *Udział WOPChem w akcjach przeciwpowodziowych na terenie kraju.*



No.	THE LIST OF ESSENTIAL EQUIPMENT	Amount
1	UAZ-469	3
2	Liquid distribution system IRS-2	24
3	Heating device UG-65	4
4	Pump unit ZP-800	4
5	Backpack decontamination set	28
6	Tent-based field bath	4
7	BRDM 2RS	2
8	Workshop	1
9	CT vehicle	10

Figure 5: DT structure separated from popchem (a variant).
Souce: M. Jarośiński, M. Świtek, I. Jurkiewicz: *Udział WOPChem w akcjach przeciwpowodziowych na terenie kraju.*

most crucial subsystem due to the fact that its forces and resources perform the majority of the tasks in the peacetime. The examples of the use of sub-units of chemical defence troops to perform non-military tasks have been mentioned before. Now, I will focus on the changes that occur in the structures of this subsystem, because they are closely linked to its functionality (It is a matter of independence of operating sub-units), and I will present the structures of the forces assigned to peace tasks.

Proposed organisational structures of 4 POPCHEM or 5 BOPCHEM have not been described in the paper as they are particularly important in performing the tasks during the war. All changes undergoing in this units tend towards gaining full independence of sub-units. Moreover, they are only acting as the providers of forces performing tasks in the peacetime. Therefore, functional structures of forces assigned to non-military tasks will be discussed in this paper.

In fact, the discussion can be limited to three main tasks which are determined by forces and resources that should be assigned to the realisation. These include all operations of forces and resources:

- assigned to ChRZA;
- removing the effects of floods;
- assigned to provide humanitarian assistance as a part of Polish Military Contingent.

Taking into account forces assigned to perform tasks of ChRZA, except contamination removal platoons and logistic platoons, the crucial role is played by components of the subsystem of contamination removal. It is contamination removal platoon that constitutes the basis of functioning of operational groups of Chemical Defence Troops ChRZA. Figure 3 shows the structure of Operational Groups of Chemical Defence Troops. It is not the only right structure and it can be freely modified, because using defined forces will depend on a particular case. Undoubtedly, the fact that these are sufficient forces to perform tasks assigned to these groups seems positive. The problem, however, lies in the number of such groups what was mentioned in the second chapter of the paper. It indicates only local use of such forces.

The issue of the forces operating in the field of removing the effects of floods seems to look completely different. As a general rule in this case decontamination teams (DT) are created, which are able to independently perform tasks in the vicinity of the home base. In this instance, the teams may take various forms.

Table 11: Full-time soldiers status of PMC (proposed).

Full-time status	
officers	23
warrant officers	12
non-commissioned officers	20
recruit service	82
Total:	137

Source: R. Bienias: *Realizacja zadań specjalnych wynikających z układów i umów międzynarodowych przez wojska obrony przeciwchemicz-nej, praca kursowa*, AON. Warsaw 2001.

Table 12: Basic equipment of decontamination company.

No.	The list of essential equipment	Amount
1.	set of devices for contamination detection UAZ-469 rs	1
2.	set of devices for contamination detection BRDM – 2rs	3
3.	chemical-radiometric laboratory PLChR	1
4.	liquid distribution system in a vehicle IRS – 2	10
5.	high-performance device for special procedures WUS – 3	2
6.	a set for sanitary procedures of people with heating device UG-65	2
7.	decontamination pump unit ZP – 800	2
8.	a truck Star – 266	6
9.	a car Tarpan Honker	3
10.	FM radio station with a Power up to 0.I kW TRC 9200	5
11.	portable M radio station 3501	19

Souce: R. Bienias: *Realizacja zadań specjalnych wynikających z układów i umów międzynarodowych przez wojska obrony przeciwchemicznej, praca kursowa*, AON. Warsaw; 2001.

During the operation on the flooded areas in 1997, these were uniforms decontamination teams separated from decontamination company (based on which type B decontamination companies will be assigned) or biological decontamination teams created on the basis of decontamination subunits operating independently from stem subunits in the designated area.

However, the concept of former command of Chemical Defence Troops WOW of decontamination teams were constituted by the entire forces and resources separated by a given unit (regiment or battalion). Only after receiving the task, a commander of such unit made a distinction on separate 'sections', which were necessary in a particular case to complete a given task. The examples of DT structures are shown in Figure 4 and 5.

In fact, both concepts are correct. The first figure shows decentralised command of the forces separated from the unit, while the second one shows strict coordination of the entire tasks by commanding all units. It may not be determined which variant is better, because after analysing the operations after flood in 1997, it may be concluded that the structure of the teams will depend on the tasks and the amount of the DT assigned will be dependent on the area. In case of one town, the second variant seems justified. However, when DT will be forced to operate simultaneously in remote areas, undoubtedly sending teams everyday to perform tasks would be senseless, hence the second variant is justified.

Designing the structures of the Polish Military Contingent (PMC) to perform humanitarian aid looks different. As the tasks will be performed abroad, forces and resources have to be carefully planned in advance. While during the removal of the effects of extraordinary risks in the country, the replacement of people, equipment and filling in the missing supplies or even the necessary equipment is still possible, the mission abroad can be performed only with the resources on site i.e. the ones previously planned and prepared.

At the moment Chemical Defence Troops were imposed with the task obliging them to assign forces and resources to cooperate with the allies in the field of humanitarian aid (CMX exercises are carried out in this field), although neither the structure nor the principles of operating were in fact determined. The structure proposed by Maj. Bienias presented in figure 16 may be one of the solutions in this field. The full-time soldiers status and basic equipment of decontamination platoon are shown in table 1 and 2.The decontamination company with the above-mentioned structure is undoubtedly able to perform multiple tasks during humanitarian missions. However, the question remains, whether despite the good organisation and a model training of the entire personnel all tasks during the peacetime can be performed. The appropriate structure and perfect preparation are not all. To perform all tasks, PMC needs the equipment, which should operate not only in our climatic conditions. The equipment should completely secure the requirements of 'new, contemporary battle field during the peacetime' and can be used to remove the effects of any threats.

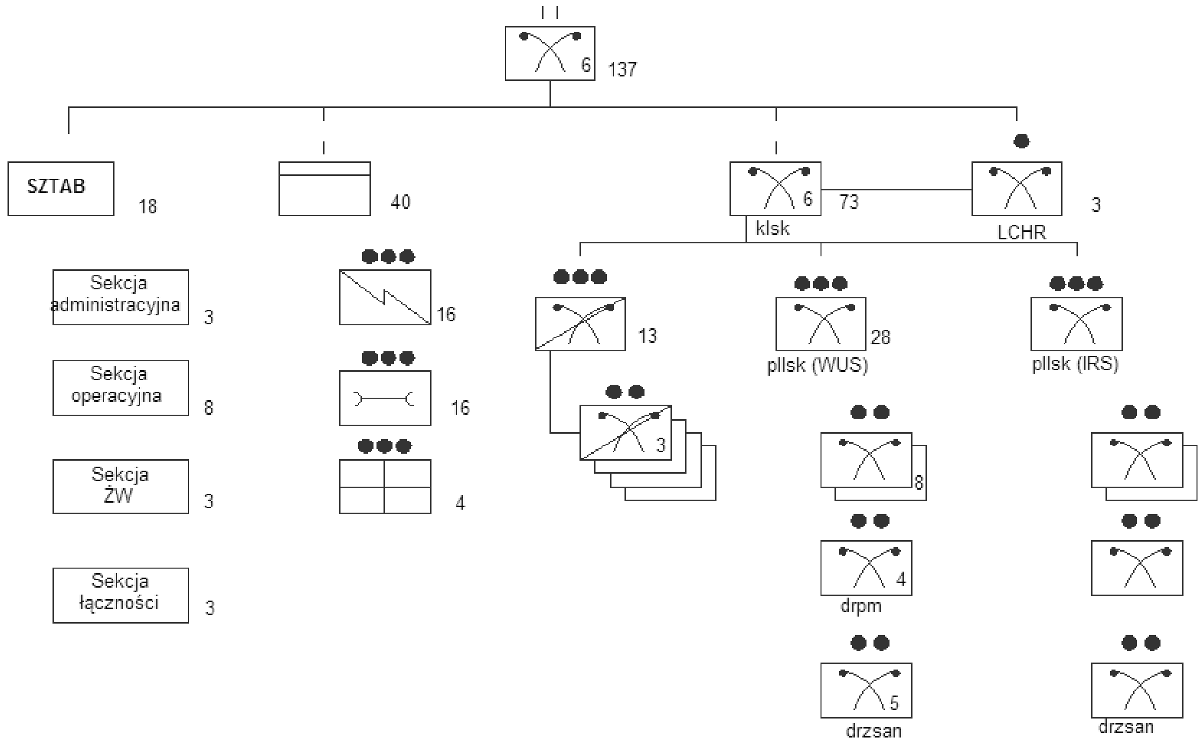


Figure 6: The organisational structure of PMC (proposed).

Source: Bienias: *Realizacja zadań specjalnych wynikających z układów i umów międzynarodowych przez wojska obrony przeciwchemicznej, praca kursowa*,
AON. Warsaw; 2001.

Explanation:

SZTAB – STAFF

sekcja administracyjna – administrative section

sekcja operacyjna – opeational section

sekcja ŻW – military Police section

sekcja łączności – COM section

klsk – decontamination company

pllsk – decontamination platoon

LCHR – chemical and radiometric laboratory

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